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Institutional Trap*

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Abstract

This paper studies the persistence of inequality and inefficient governance in a physical capital accumulation model with perfect information, missing credit markets and endogenous barriers to entry. When access to investment opportunities is regulated, rent-seeking entrepreneurs form coalitions of potentially varying size to bribe a regulator to restrict entry. Small coalitions run short of resources, while large coalitions suffer more severe free-rider problems. The distribution of wealth thus determines the equilibrium coalition structure of the economy and consequently the level of regulatory capture. A dynamic analysis supports the persistence of inefficiencies in the long run. Initial conditions determine whether the economy converges to a steady state characterized by efficient governance and low levels of inequality, or a path toward an institutional trap where regulatory capture and wealth inequality reinforce each other.

Keywords: Institutions, inequality, endogenous coalitions, persistence.

JEL classification: O12, D31, D45, D72

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1 Introduction

What explains the persistence of institutions that are harmful to investment and growth? A major puzzle faced by economists is the observed differences in economic development between countries. Observed differences seem to be attributable to differences in institutions. To illustrate this point, figure 1 plots, for a sample of East Asian countries, the level of economic development against an index of corruption.[1] Note that the same pattern is observed using other measures of governance as well. While assessing the causality between institutional environments and economic performance, De Soto (1989), Djankov, Shleifer and Vishny (2002) and Parente and Prescott (2000) detail evidence of barriers to institutional change and argue that such barriers are key determinants of economic underdevelopment. Moreover, there is evidence that changes in institutions, once implemented, can have real effects on subsequent economic performance. Besley (1995), as well as Banerjee, Gertler and Ghatak (2002) find that improved land rights have a significant impact in Ghana and West Bengal, respectively, increasing agricultural productivity and investment.

This raises a key question: if some arrangements seem so detrimental to economic development, why don't governments implement institutions that foster investment and promote growth? Figure 2 plots, for the same set of countries as previously, the concentration of family control, the percentage of total market capitalization owned by the 15 wealthiest families in a given country, against the quality of governance, proxied by the corruption index. The negative correlation is strong and robust to several other measures of governance.[2] Claessens, Djankov and Lang (1998) suggest that the "concentration of corporate control is a major determinant in the evolution of the legal system, i.e. relationships exist between ownership structure of the whole corporate sector and the level of institutional development." This statement motivates the present analysis. In a political economy model, agents interact in such a way that the distribution of wealth determines the quality of governance. Regulation introduces the possibility of imperfect competition in the product market, creating rents. Entrepreneurs may thus

[1] The corruption index is the "assessment of the corruption in government. Lower scores indicate that 'high government officials are likely to demand special payment [and] illegal payments are generally expected throughout lower levels of government [in the form of] bribes connected with import and export licenses' [...]" (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998, p.1124).

[2] The Pearson correlation coefficient is equal to -0.8

engage in rent-seeking activity, which takes the form of restrictions on entry. A coalition of entrepreneurs - the insiders - forms and offers bribes to a bureaucrat in order to limit entry from other potential entrepreneurs - the outsiders. Hence, insiders enjoy higher market power. The level of capture in the economy is driven by the group size paradox: small coalitions fall short of resources while large coalitions face free-riding problems. The extent of regulatory capture is determined by the distribution of wealth: when wealth is concentrated in the hands of few people, small coalitions form and successfully mitigate the free-rider problem so that entry is severely limited; on the other hand, more equally distributed wealth prohibits such collusive behavior and regulation is more efficient. In a dynamic framework, initial conditions determine the trajectory the economy follows. On a path toward positive institutional change, regulation improves over time and inequality eventually vanishes. Conversely, an institutional trap is characterized by a widening gap between a rich and small entrepreneurial elite and the increasingly impoverished masses.

The results derived in this paper crucially rely on the assumptions that credit markets are imperfect and that transfers between agents are limited. The combination of political economy considerations and missing credit markets creates a non-convexity of the investment technology induced by the emergence of barriers to entry. However, unlike most models of this class (see e.g. Galor and Zeira, 1993), the threshold effect is endogenous. Finally, an institutional trap forms when the trajectory followed by the level of capture is monotonic: high barriers to entry increase inequality, which exacerbates capture in subsequent periods.

The originality of this paper is twofold. First, it provides a rationale for the persistence of inefficiencies: under weak conditions on the parameters of the model, the long-run economy exhibits multiple steady-states. While the persistence of inequality has been thoroughly investigated in the literature, little emphasis has so far been put on political economy channels.[3] Second, as a consequence of the multiplicity of steady-states, small differences in initial conditions are sufficient to account for large long-run differences in outcomes. Most studies in the comparative economics literature (see e.g. Glaeser and Shleifer, 2002) rely on a significant heterogeneity between economies to explain differences in institutional arrangements adopted. Indeed, in standard static models, comparative statics are essentially continu-

[3] For a survey of the literature on persistent inequality, see Piketty (2000).

ous with respect to the parameters of interest; a dynamic framework is then one way to generate discontinuities underlying an amplification effect.

The main contribution of this paper is to provide a mechanism of institutional choice and persistence, which relies on parsimonious assumptions on the structure of the economy. Political economy models such as Alesina and Rodrik (1994) or Persson and Tabellini (1994) examine channels through which inequality determines redistribution. However, while the extent of redistribution is an equilibrium outcome of these models, another key institution, i.e. the political system itself, is exogenously given. The coalition formation game described in this paper does not rely on such assumption and delivers an opposite result: higher levels of inequality decrease redistribution as the political system gets biased toward wealthiest individuals. On the other hand, Grossman and Helpman (1994) endogenize the political outcome of an economy subject to pressure groups. However, the authors merely address the issue of static or dynamic lobby formation, which is the central concern of the present analysis. Admittedly, assuming the distribution of wealth or power in an economy as exogenous is likely to undermine the understanding of long-run institutional change. Attempts to analyze the mechanics of persistence of institutional arrangements have so far been limited.[4] The ambition of this paper is hence to fill this gap.

This paper builds on the insights of the theoretical literature on political influence and rent-seeking, pioneered in its modern form by Olson (1965), Stigler (1971), Krueger (1974), and Becker (1983). However, most of the literature dealing with persistence remains empirical. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998, 1999) and Acemoglu, Johnson and Robinson (2001) find empirical evidence that institutions of the past remain significant determinants of current institutions as well as current outcomes. More recently, Banerjee and Iyer (2002) argue that institutions established in India during the colonial era still affect current economic performance.

The rest of the paper is organized as follows. Section 2 lays out the model in its static form and the equilibrium is characterized in section 3. The dynamic analysis is left to section 4. Section 5 concludes. All the proofs are left to the Appendix.

[4] North (1990) and Engerman and Sokoloff (1997) are such examples but little formalization of the argument has been undertaken.

2 The Static Model

Consider a population of N individuals indexed by $i \in I$, and one bureaucrat. N is large and normalized to 1. There are two goods in the economy, a production good and a consumption good. Production goods will be referred to as *capital* and consumption goods as *wealth*. Individuals are each endowed with an initial amount of wealth $(a_i)_{i \in I}$. The wealth distribution is characterized by a cumulative distribution function $F(.)$. The time horizon consists of three dates. At time $T = 0$, individuals interact with a bureaucrat who issues licenses. At time $T = 1$, individuals receiving a license become entrepreneurs, the remaining are subsistence workers. Licensed entrepreneurs supply capital. Finally, at time $T = 2$, a production industry buys capital to produce wealth. Projects are then liquidated, profits are realized, capital and labor are rewarded, consumption takes place and agents die. A storage technology is available to all entrepreneurs at no depreciation. The timing of the static economy is summarized in figure 3.

2.1 Coalition Formation and Licensing

One bureaucrat grants licenses at time $T = 0$. Licenses are necessary for individuals who want to become entrepreneurs at time $T = 1$. Licenses are issued at no cost, but the bureaucrat is assumed to care only about his own consumption, and is therefore willing to accept bribes. Individuals form coalitions and offer transfers to the bureaucrat in order to limit the number of licenses granted.

Before going further, some notations can be useful:

- $P(I)$ is the set of all subsets of I.
- For any $\gamma \in P(I)$, the complementary set of γ is denoted $\bar{\gamma} \equiv I \backslash \gamma$.
- The cardinality of any set $\gamma \in P(I)$ is written $\eta^{\gamma} \equiv \sum_{i \in I} 1_{i \in \gamma}$, where 1_X is the indicator function of X. By abuse of notation, a singleton is considered to have size zero.

2.1.1 Stage 1: Coalition announcements

Individuals are sequentially announcing the coalition they want to belong to. The order of announcements will later be shown to be irrelevant. Explicit reference to the order of moves is henceforth omitted.

Definition 1 *A* coalition announcement *made by individual i is a subset $\gamma_i \in P(I)$ such that $i \in \gamma_i$. An* announcement profile *is a sequence of coalition announcements $(\gamma_i)_{i \in I}$.*

Once all announcements have been made, coalitions form.

Definition 2 *A* coalition structure Φ *is a partition of I. A coalition structure Φ is* consistent *with the announcement profile $(\gamma_i)_{i \in I}$ if $\forall \varphi \in \Phi, \forall i \in \varphi$,*

$$\left\{ \begin{array}{cc} & \varphi = \{i\} \\ or & \varphi = \gamma_i \end{array} \right. .$$

In other words, any non-empty element of a consistent coalition structure is either reduced to a singleton, or consists of individuals that all made the same announcement in the first stage. Such procedure is equivalent to a unanimity decision rule. For example, pick two individuals i and j in I. If i announces she wants to be in a coalition with j $(j \in \gamma_i)$, but j does not $\left(i \notin \gamma_j\right)$, then, in any consistent coalition structure, i stands alone.

2.1.2 Stage 2: Regulatory capture

Observing the newly formed lobby structure, the bureaucrat makes a coalition choice.

Definition 3 *A* coalition choice φ *is an element of $P(I)$. Any member of φ is called an insider, while members of $\bar{\varphi}$ are referred to as outsiders. A coalition choice φ is* consistent *with a coalition structure Φ if $\varphi \in \Phi$.*

2.1.3 Stage 3: Bargaining over contributions and licensing

Insiders and outsiders determine independently the levels of contribution they are willing to offer to the bureaucrat. If insiders offer a larger aggregate contribution, then outsiders are prevented from entry, otherwise licenses are granted to outsiders. The bargaining game over contributions consists of two identical rounds of negotiations and a breaking rule.

Each round of negotiations consists of individuals sequentially offering contribution schedules. The order in which offers are made is randomly chosen. Here again, no specific mention to the realized order of moves is being made for notational simplicity.

Definition 4 *For any* $\varphi \in P(I)$, *a* contribution schedule *proposed by individual* $i \in \varphi$ *is a vector* $\left(s_j^i\right)_{j\in\varphi} \in R^{\eta^\varphi}$. *Consensus is reached if* $\left(s_j^i\right)_{i,j\in\varphi}$ *is such that* $\forall i, j, k \in \varphi$, $s_k^i = s_k^j$. *Then, the* final contribution schedule *will be denoted by* $(s_i)_{i\in\varphi}$.

Agreement is thus obtained when every member of a given coalition proposes the same contribution schedule. The timing of the bargaining game is then simply:

- If consensus is reached at the end of the first round, then the game ends. Consensus is then said to be reached with no delay.
- Otherwise, a second round of negotiations take place. If consensus is reached, then the game ends.
- Otherwise the final contribution schedule is the zero-contribution schedule: $\forall i, s_i = 0$.

Finally, once offers are made, the bureaucrats decides whom to grant licenses to.

Definition 5 *The bureaucrat's* licensing decision *is a subset* $\Gamma \in P(I)$. *A licensing decision* Γ *is* consistent *with a coalition choice* φ *if*

$$\Gamma \in \{I, \varphi\}.$$

A licensing decision is considered to be consistent with a coalition choice if the bureaucrat grants a license to all insiders and chooses between only two options: allowing or deterring entry. Figure 4 summarizes the timing of the coalition formation game.

2.2 Intermediate and Final Productions

The licensing decision Γ thus determines the set of entrepreneurs. Individuals outside Γ earn a subsistence wage w, while each member of Γ supplies one unit of capital at market price r to a final industry, so that the aggregate supply of capital is given by η^Γ. A final industry buys capital at rental rate r and produces wealth according to a technology $\pi(.)$; consequently, aggregate production of wealth is equal to $\pi(K)$, where K is the aggregate demand of capital.

2.3 Actions and Payoffs

A first assumption consists of restricting the analysis to games where agents take consistent actions, following the definitions of consistency provided previously.

2.3.1 Missing markets

The following assumption further restricts the set of possible actions:

Assumption A1:
There is no credit market.

Assumption A1 is a key element and implies that no individual can access outside finance. However, within coalitions, transfers are allowed among members. This translates into the following conditions on contribution schedules: any contribution schedule $(s_i)_{i\in\varphi}$ must verify

$$0 \leq \quad \sum\nolimits_{i\in\varphi} s_i \quad \leq \sum\nolimits_{i\in\varphi} a_i \ . \tag{1}$$

Coalitions are thus potentially credit constrained.

2.3.2 Preferences

In this model, agents are all considered risk-neutral and thus maximize time $T = 2$ wealth. Keeping in mind that actions are consistent, the payoff profile is determined by the bureaucrat's licensing decision and the contribution schedule. Given that r is the prevalent rental rate and using the notations introduced previously, payoffs can be written as follows:[5]

Entrepreneurs and wage earners: Agents are risk-neutral and value time $T = 2$ consumption levels. For any $i \in I$,

$$U_i\left(s_i, \varphi, \Gamma\right) = \begin{cases} r + a_i - s_i & if \quad i \in \varphi \quad and \quad \Gamma = \varphi \\ r + a_i & if \quad i \in \varphi \quad and \quad \Gamma = I \\ w + a_i & if \quad i \in \bar{\varphi} \quad and \quad \Gamma = \varphi \\ r + a_i - s_i & if \quad i \in \bar{\varphi} \quad and \quad \Gamma = I \end{cases} . \tag{2}$$

[5] A rigorous notation would require to label properly each terminal node of the extensive-form game. However, for simplicity, actions that do not directly affect payoffs are omitted in the notation.

The bureaucrat: The bureaucrat is risk-neutral and is assumed to care only about the amount that is transferred to him as bribes.

$$U_b\left(\varphi, \Gamma, (s_i)_{i\in\varphi}, (s_i)_{i\in\bar{\varphi}}\right) = \begin{cases} \sum_{i\in\varphi} s_i & if \quad \Gamma = \varphi \\ \sum_{i\in\bar{\varphi}} s_i & if \quad \Gamma = I \end{cases}. \tag{3}$$

Final producers: Final producers behave competitively. Facing a rental rate r, they maximize profits.

$$\Pi(K) = \pi(K) - rK \tag{4}$$

Final producers set a demand for capital in order to maximize profits. The bureaucrat makes a coalition choice and then receives contribution from insiders if eviction occurs $(\Gamma = \varphi)$, and contributions from outsiders if entry is permitted $(\Gamma = I)$. Such specification implicitly relies on the the fact that contingent contracts can be written and enforced between members of coalitions and the bureaucrat; this is so by assuming, for example, that the bureaucrat has developed a reputation to enforce such contracts. Finally, agents' payoffs depend on their occupation and whether bribes are paid to the bureaucrat. An entrepreneur $i \in \Gamma$, sells her unit produced at price r while wage earners receive a fixed amount w. Furthermore agent i has to make a payment s_i to the bureaucrat when she is an insider and eviction was implemented, or when she is an outsider and entry occurred.

3 Equilibrium of the Static Model

To avoid cumbersome notations, a complete and formal description of the multi-stage game is not going to be provided. The game is a complete information game in which the set of players includes the population of agents, the bureaucrat, final producers. The order of moves is as illustrated in figures 3 and 4, and is determined by exogenous events (moves by "Nature"), when announcements are made sequentially. Choice sets are reduced to consistent actions and are subject to condition (1). Finally the players' payoffs are given by equations (2) to (4). The set of behavior strategies for each player can now be easily inferred. A natural equilibrium concept to be adopted is subgame-perfection. Some further restrictions will be made along the analysis. The rest of the section characterizes possible equilibrium outcomes, solving the game backward.

3.1 Intermediate and Final Productions

In this section, Γ is the set of entrepreneurs. Entrepreneurs received a license at the end of time $T = 0$. They supply one unit of capital to final producers and therefore face a demand function of the form

$$r = \pi' (K), \tag{5}$$

where K is the aggregate demand of capital. Final producers maximize profits and the necessary and sufficient first-order condition is given by (5). As the market for capital goods must clear, entrepreneur $i's$ gross-profit becomes

$$r = \pi' \left(\eta^{\Gamma}\right).$$

Before going further, one assumption about the structure of the demand function need to be made.

Assumption A2: Concavity of the profit function
For any $V \geq 1$, the function $V \mapsto \pi' (V) V$ is decreasing in V.

Assumption A2 implies that aggregate profits decreases as the number of entrepreneurs increases. Competition is exacerbated as the number of entrepreneurs increases and the outcome moves further away from the monopoly solution. This result relies on the implicit assumption that no collusion can be enforced between entrepreneurs in order to mitigate free-riding inherent to Cournot competition.

Assumption A3: No-collusion assumption
At time $T = 1$, entrepreneurs cannot contract on side payments.

Assumption A3 makes contracts between entrepreneurs not verifiable so that no entrepreneur has an incentive not to produce. Assumption A3 is sufficient, but not necessary to generate free-riding between Cournot competitors. As long as collusion is assumed to be imperfect and monotonic in the number of players, the results presented in this paper will be robust to weaker versions of A3.

3.2 Coalition Formation and Licensing

At this stage, the bureaucrat's licensing decision is driven by the levels of contingent bribes offered to him by insiders and outsiders respectively. For a given coalition choice $\varphi \in P(I)$, and corresponding contribution schedules

$(s_i)_{i\in\varphi}$ and $(s_i)_{i\in\bar{\varphi}}$, the equilibrium licensing decision Γ obeys the following rule:

$$\Gamma = \begin{cases} \varphi & if \ \sum_{i\in\varphi} s_i \geq \sum_{i\in\bar{\varphi}} s_i \\ I & otherwise \end{cases} .$$

It is assumed that if the bureaucrat is indifferent between the two options, he will favor insiders. Before investigating how coalitions form, it is necessary to impose some restrictions on the parameters of the model. Agents are willing to contribute to get licenses if being an entrepreneur is profitable. This implies that the subsistence wage is low enough. To simplify further the analysis, the following assumption is made:

Assumption A4: Subsistence wage and profits
The subsistence wage is such that: $w < \pi'(1)$ and for any $i \in I$, $a_i \leq \pi'(1) - w$

3.2.1 Contribution schedules

Given the choice rule adopted by the bureaucrat, insiders and outsiders bargain independently over contributions to the bureaucrat. Under assumption A1, if $\varphi \in P(I)$ is a coalition choice made by the bureaucrat at a previous node, insiders' maximum aggregate contribution is given by the aggregate benefit from eviction of outsiders, given that the coalition is subject to a wealth constraint, i.e.

$$\sum_{i\in\varphi} s_i \leq S^{\varphi} \equiv \min\left\{\sum_{i\in\varphi} a_i \ ; \ \eta^{\varphi}\left[\pi'(\eta^{\varphi}) - \pi'(1)\right]\right\}.$$

Similarly, outsiders are willing to "sell their firms to the bureaucrat", so that outsiders' maximum aggregate contribution is subject to

$$\sum_{i\in\bar{\varphi}} s_i \leq S^{\bar{\varphi}} \equiv \min\left\{\sum_{i\in\bar{\varphi}} a_i \ ; \ (1-\eta^{\varphi})\left[\pi'(1) - w\right]\right\}.$$

Under assumption A4, $S^{\bar{\varphi}}$ is just equal to aggregate wealth in $\bar{\varphi}$: $S^{\bar{\varphi}} = \sum_{i\in\bar{\varphi}} a_i$. Although the outcome of the bargaining games can be easily guessed, the following lemma formalizes the result:

Proposition 6 *For any coalition choice* $\varphi \in P(I)$,

$$\sum_{i\in\varphi} s_i = \sum_{i\in\bar{\varphi}} s_i = \min\left\{S^{\varphi}; S^{\bar{\varphi}}\right\}$$

and the contribution schedule profiles are obtained with no delay.[6] *Furthermore, agents in the same coalition all contribute the same amount.*

The lemma just reaffirms that the coalition with higher willingness/ability to pay wins the auction for licenses and pays the second price. The bargaining game is also characterized by no delay in such a way that all members of a given coalition contribute the same amount. The driving force of the model is carried out in the lemma. The size of the coalition, η^{φ} determines each coalition's ability to pay, so that larger coalitions of insiders are better able to prevent entry. However, if η^{φ} gets large, the willingness constraint is likely to bind, so that large coalitions are no more willing to block entry. Ex-post competition undermines ex-ante incentives to deter entry. These two effects constitute the group size paradox. Figure 5 illustrates the intuition. The horizontal axis plots insiders' coalition sizes. The vertical axis measures the strength of each coalition (insiders or outsiders). The upward sloping line shows insiders' ability to bribe that increases with coalition size (line AA), whereas the downward sloping line is the (symmetric) ability to pay for outsiders (line BB). Finally, the downward sloping curve (line CC) plots insiders' willingness to pay as the coalition size increases (outsiders' willingness to pay is not shown, as it is assumed that wealth constraints are binding). The thick line then plots the maximum contribution that insiders can gather so that entry occurs if and only if the thick line is below the BB line. The coalition size space is thus divided into three regions. For small coalitions ($\eta^{\varphi} < \eta^{\min}$), insiders do not have enough resources to successfully bribe the bureaucrat. For large coalitions ($\eta^{\varphi} > \eta^{\max}$), the coalition of insiders is too large, so that free-riding undermines the willingness to block entry. For intermediate-size coalitions, entry is deterred.

3.2.2 Coalition choice

The bureaucrat faces a coalition structure Φ and needs to pick one coalition in Φ as coalition of insiders. Naturally, the bureaucrat will choose the coalition that is likely to generate the highest level of bribes. The coalition choice φ is thus given by

$$\varphi = \arg\max_{\gamma \in \Phi} \left[\min \left\{ S^{\gamma}; S^{\bar{\gamma}} \right\} \right].$$

[6] It is assumed that if agents are indifferent between consensus and delay, they choose consensus. Some impatience (not modeled here) would generate such result.

3.2.3 Coalition announcements and coalition structure

First, let's define the concept of preferred coalition announcement.

Definition 7 *Individual $i's$ preferred coalition announcement γ_i^m, is the coalition that forms in proper subgames that maximize $i's$ payoffs.*

To focus on interesting cases, some restrictions on strategy spaces are subsequently made.

Assumption A5: Deletion of weakly dominated strategies
$\forall i \in I,\ \gamma_i \in \{\gamma \in P(I),\ i \in \gamma \text{ and } S^{\gamma} - S^{\bar{\gamma}} \geq 0\}.$

Assumption A5 does not allow agents to announce a coalition that is not a winning coalition in any proper subgame where it is chosen by the bureaucrat. Then, on the equilibrium path, individual $i's$ preferred coalition announcement γ_i^m is defined by

$$\gamma_i^m = \arg \max_{\substack{\gamma \in P(I) \\ i \in \gamma \\ S^{\gamma} - S^{\bar{\gamma}} \geq 0}} \pi'(\eta^{\gamma}) - \frac{1}{\eta^{\gamma}} S^{\bar{\gamma}}. \tag{6}$$

In other words, $i's$ preferred coalition announcement maximizes $i's$ profits net of contributions made to the bureaucrat that are moreover equally split among members of the coalition. When wealth constraints are binding, individual $i's$ preferred coalition announcement has the property of being convex.

Lemma 8 *Under assumption A4, for any $i \in I$, $i's$ preferred coalition announcement γ_i^m is* convex, *i.e.* $\forall j, k \in I \backslash \{i\}$,

$$(j \in \gamma_i^m) \wedge (a_j < a_k) \Rightarrow k \in \gamma_i^m$$

The intuition of this lemma is straightforward: when wealth constraints are binding, a richer individual is always preferred as insider because a richer outsider is always more expensive to evict. Thus, the richest individual in the economy, indexed by ι, belongs to all the preferred coalition announcements. The following proposition then characterizes the (unique) equilibrium coalition structure:

Proposition 9 *Under assumptions A1-A5, irrespective of the order of announcements, the unique equilibrium coalition structure is given by: $\forall i \in P(I)$,*

$$\Phi = \left\{ \gamma_{\iota}^m, \{i\}_{i \in \bar{\gamma}_{\iota}^m}, \varnothing \right\}.$$

It is worth noting that several coalition announcements profile can support such coalition structure. Indeed, assumption A5 does not restrict coalition announcements to either γ_ι^m or I. The uniqueness of the coalition structure relies on the property that γ_ι^m is also the preferred coalition for all its members and no coalition outside γ_ι^m can be a winning coalition. The property that Φ is uniquely determined irrespective of the order of announcement is equivalent to saying that Φ is the only Coalition-Proof Nash Equilibrium in a similar game where coalition announcements are made simultaneously instead of sequentially.[7] This result, while similar to Grossman and Helpman (1994), does not have the property that the equilibrium is "truthful", because credit constraints may bind.[8]

3.3 A Full Characterization of the Equilibrium

The convexity property of the preferred coalition announcement γ_ι^m implies that there exists a wealth level a^* such that

$$\gamma_\iota^m = \{i \in I,\ a_i \geq a^*\},$$

and consequently

$$\eta^{\gamma_\iota^m} = 1 - F(a^*).$$

The wealth level a^* is the barrier to entry that individuals face and is determined by (6), which can now be written as:

$$a^* = \arg\max_a \pi' [1 - F(a)] - \frac{1}{1 - F(a)} \int_0^a \tilde{a} dF(\tilde{a}),$$

subject to

$$\int_0^a \tilde{a} dF(\tilde{a}) \leq \min \left\{ \int_a^{+\infty} \tilde{a} dF(\tilde{a}) \ ; \ \{\pi' [1 - F(a)] - \pi'(1)\} [1 - F(a)] \right\}.^9$$

To understand the determinants of the equilibrium coalition, it is useful to look at the first-order conditions of program (6). Let $\lambda \geq 0$ be the Lagrange

[7] See Bernheim, Peleg and Whinston (1987).

[8] The Truthful Nash Equilibrium concept has been developed by Bernheim and Whinston (1986).

[9] To account for the discreteness of the population while maintaining consistent notations, the integral $\int_0^a dF(\tilde{a})$ does not include the upper-bound a, while $\int_a^{+\infty} dF(\tilde{a})$ does include a.

multiplier associated to the budget constraint. Assuming that wealth constraints are binding around a^*, a^* must verify

$$-\pi'' \left[1 - F\left(a^*\right)\right] = \frac{1}{1 - F\left(a^*\right)} \left[a^* + \frac{1}{1 - F\left(a^*\right)} \int_0^{a^*} adF\left(a\right)\right] + 2\lambda a^*.^{10} \quad (7)$$

Equation (7) summarizes the group size paradox, trading off ex-post competition (left-hand side) and ex-ante contribution levels (right-hand side). The left-hand side of equality (7) is the aggregate benefit when the marginal insider is excluded from the coalition: as ex-post competition is decreased, profits are marginally increased for each remaining insider. The right-hand side of (7) is the total cost of evicting the marginal insider. The first two elements are the costs incurred by the insiders on the intensive margin: such cost is the additional payment necessary to win the bid against the outsider (i.e. a^*, the marginal insider's wealth) and the opportunity cost as the marginal insider will not contribute any more, such loss being $\frac{1}{1-F(a^*)} \int_0^{a^*} adF\left(a\right)$. When the aggregate wealth constraint is binding, the Lagrange multiplier λ is positive so that evicting the marginal insider has a cost on the extensive margin, which consists of the extra eviction cost a^* and the potential loss in contribution also equal to a^*. The shadow value of the marginal insider increases with her wealth as she is more likely to become pivotal. Thus, the profit function $\pi'(.)$ and the wealth distribution $F(.)$ determine the size of the entry barriers. When prices are more sensitive to output, incentives to evict more entrepreneurs are higher. More importantly, the wealth distribution affects the trade-off described in (7) in two ways: it affects the level of ex-post competition (left-hand side of (7)) and it also affect the ex-ante contribution schedule (right-hand side). Thus, more concentrated wealth makes small coalitions more willing as well as more able to create large barriers to entry.

4 Dynamics

The model need to be extended to analyze the behavior of the economy in a dynamic framework. For $t = 1, ...,$ each generation plays the static game described above and at the end of the period, instead of consuming all their wealth, individuals can choose between consumption and bequests to one and only one offspring. It is assumed that individuals in each generation

[10] The notation $\pi''(\eta)$ corresponds to $\pi'\left(\eta^+\right) - \pi'(\eta)$ where η^+ is the size of a coalition that contains one additional member compared to a coalition of size η.

have the following time-invariant utility:[11] $\forall t \geq 1$,

$$U_i^t\left(c_i^t, b_i^t\right) = \left(c_i^t\right)^{1-\beta}\left(b_i^t\right)^{\beta},$$

where c_i^t is individual $i's$ consumption and b_i^t is the level bequeathed to $i's$ offspring in generation t. An immediate implication of this specification is that a fraction β of individual $i's$ wealth is transferred to the next generation. Long-run results will be derived with respect to the flow $F^t(.)$, where $F^t(.)$ is generation-t distribution of wealth. The dynamics of the wealth distribution are governed by: $\forall i \in I, \forall t \geq 1$

$$a_i^{t+1} = \begin{cases} \beta\left\{\pi'\left[1 - F^t\left(a_t^*\right)\right] + a_i^t - \frac{1}{1-F^t\left(a_t^*\right)}\int_0^{a_t^*} a dF^t(a)\right\} & if\ a_i^t \geq a_t^* \\ \beta\left\{w + a_i^t\right\} & otherwise \end{cases},$$

where a_t^* is determined by (7) when the wealth distribution considered is $F^t(.)$. Note that the knowledge of $F^t(.)$ determines completely the transition of the economy from generation t to generation $t+1$.

4.1 Steady States and Local Stability

As a first example, let's look at the case where no bribing occurs. Then for any dynasty $i \in I$, the wealth process $\left(a_i^t\right)_{i \in I}^{t \geq 1}$ is a Markov process with stationary transitions: $\forall i \in I, \forall t \geq 1$,

$$a_i^{t+1} = \beta\left[\pi'(1) + a_i^t\right].$$

In the long-run, all individuals follow a trajectory as shown in figure 6 so that they end up with the same wealth level equal to

$$a^{\infty}(1) \equiv \frac{\beta}{1-\beta}\pi'(1).$$

The following lemma formalizes this result:

Lemma 10 *When the bureaucrat does not take bribes, the distribution* $F^1(a) \equiv 1_{\{a < a^{\infty}(1)\}}$ *is globally stable.*

It will be convenient for the rest of the paper to introduce the following notation:

$$a^{\infty} \equiv \frac{\beta}{1-\beta}w, \tag{8}$$

[11] For each variable of interest, a superscript t indicates the value of that variable in generation t.

and $\forall \eta \in [0,1]$,

$$a^{\infty}(\eta) \equiv \frac{\beta}{1-\beta}\left[\pi'(\eta) - \frac{1-\eta}{\eta}\frac{\beta}{1-\beta}w\right]. \tag{9}$$

The next lemma gives a necessary condition on possible steady-states.

Lemma 11 *The set of steady-state distributions is a subset of*

$$\left\{F \in R^{[0,1]},\ \exists \eta \in [0,1],\ F = F^{\eta}\right\}$$

where $\forall a \in R$,

$$F^{\eta}(a) \equiv \begin{cases} 0 & if \quad a < a^{\infty} \\ 1-\eta & if \quad a^{\infty} \leq a < a^{\infty}(\eta) \\ 1 & if \quad a \geq a^{\infty}(\eta) \end{cases},$$

such that a^{∞} *and* $a^{\infty}(\eta)$ *are defined by* (8) *and* (9) *respectively.*

However, any distribution $F^{\eta}(.)$ is not necessarily a steady state. The next proposition characterizes the set of steady states and gives some local stability results.

Assumption A6: Specification of the demand function
For any $V \geq 1$, the function $V \mapsto \pi'(V)V$ is convex in V.

Assumption A6 implies that the aggregate loss of an additional entrepreneur due to increased competition, is decreasing as the mass of initial entrepreneurs increases. This assumption is sufficient to generate the following stability result:

Proposition 12 *Under assumption A6, there exists an open neighborhood* B *of* $\frac{1}{2}$ *and an open neighborhood* W *of* 0 *such that, for any* $(\beta, w) \in B \times W$, *there exists* $\varepsilon \in [0,1]$, *such that the distribution* $F^{\eta}(.)$ *is a steady state if and only if* $\eta \in \{0\} \cup [1-\varepsilon, 1]$. *Furthermore, for any* $\eta \in \{0\} \cup (1-\varepsilon, 1]$, $F^{\eta}(.)$ *is asymptotically stable.*[12]

When w is small enough, whether some values η can be associated with a distribution $F^{\eta}(.)$ that is a steady state, depends on the shape of the demand function $\pi(.)$, which determines the marginal cost of an extra outsider and is measured by (7). Assumption A6 implies monotonicity in the

[12] An interval $(a,b]$ contains b but not a.

marginal benefit of a marginal exclusion. Thus, if $F^{\eta}(.)$ is a steady state for some η, then it is a steady state for any larger η. For low values of η, the benefits of further exclusion are high so that corresponding limiting distributions cannot be steady states. This is not true however for $\eta = 0$, as there does not exist a smaller coalition. Assuming a different behavior for $\pi(.)$ would generate different sets of steady state, all including $F^{0}(.)$ when w is small enough. The asymptotic stability results rely on the property that for a given distribution $F^{\eta}(.)$, large wealth redistributions are necessary to change subsequent equilibrium outcomes. An *institutional trap* is a situation where the economy's wealth distribution falls into $F^{0}(.)'s$ basin of attraction. The dynamics of the wealth distribution is illustrated in figure 7. In a given generation t, individuals with wealth below the threshold a_t^* have their wealth move toward a^{∞}, while individuals above that threshold have their wealth move toward $a^{\infty}(\eta^t)$. The following proposition gives more precise properties of the basins of attraction of $F^{1}(.)$.

Proposition 13 *If $F^{1}(.)$ is a steady state, then $F^{1}(.)'s$ basin of attraction contains any distribution flow $F^{t}(.)$ such that $\{I, \varnothing\}$ is the equilibrium coalition of the economy for some generation $t \geq 1$.*

Turning to $F^{0}(.)$, for low enough levels of wage w, coalitions that are too small will shrink over time until the singleton is reached. The following proposition provides some somewhat weak sufficient conditions for an distribution flow to be in the basin of attraction of $F^{0}(.)$.

Proposition 14 *Under the following conditions:*

- $\forall i \in I$,
$$a_i \geq a^{\infty} \tag{10}$$

- $\forall \eta \in [0,1]$,
$$\lim_{\eta \to 0} \eta \pi'(\eta) > \frac{1-\beta}{\beta}\left[\pi'(1) - w\right] + w \tag{11}$$

- $\forall \eta \in [0,1]$,
$$-\frac{d}{d\eta}\left[\eta \pi'(\eta)\right] > w \tag{12}$$

- $\exists \eta, \lambda \in [0,1]$,
$$1 + \frac{\beta}{1-\beta}\frac{1-\lambda}{\lambda} < \frac{\pi'(\lambda\eta)}{\pi'(\eta)}, \tag{13}$$

there exists $\bar{\eta} \geq 0$ such that $F^0(.)'s$ basin of attraction contains any distribution flow $F^t(.)$ for some generation $t \geq 1$ characterized by an equilibrium coalition structure of the form $\left\{\Gamma^t, \{i\}_{i \in \Gamma^t}, \varnothing\right\}$ where $\eta^{\Gamma^t} \leq \bar{\eta}$.

If the grand coalition ever forms at a point in time, then it will keep forming in all subsequent generations so that the wealth distribution converges to $F^1(.)$. The intuition is the following: wealth among entrepreneurs is converging so that if in one generation the only possible coalition is the grand coalition, then in future periods, the relative wealth gap between poor and rich individuals has narrowed so that the grand coalition remains the equilibrium outcome. On the other hand, if a generation exhibits an equilibrium coalition size below some threshold, such coalition will shrink in all subsequent periods and the distribution converges to $F^0(.)$. The intuition is similar to the previous case. When the wealth gap between insiders and outsiders widens, then coalitions are shrinking over time toward the size zero steady state.

4.2 Convergence: Simulation

Although the previous propositions characterized sufficient conditions for the existence of a steady-state distribution, little has been said about convergence as cycles cannot be ruled out. This issue is common to models of this class.[13] Thus, the present paragraph proposes to simulate the dynamic behavior of the economy in a simple framework. Considering a population of 100 individuals, each agent is endowed with a level of wealth that can be either high (a_H) or low $(a_L < a_H)$. Thus, economies differ only by the initial percentage of poor individuals. Four cases are simulated ranging from low levels of initial inequality (5% of the population has wealth a_L) to high levels of initial inequality (the ratio is then 40%). The intermediate cases, medium low and medium high levels of initial inequality, correspond to 10% and 15% of poor individuals respectively. The results of the simulation are shown in figure 8.[14] While the horizontal axis is the time line, the vertical axis measures the size of winning coalitions η^t at each generation. For example, 100% at generation t means that the grand coalition formed at

[13] For examples of non-linear Markov processes in similar situations, see Banerjee and Newman (1991), Aghion and Bolton (1997) or Piketty (1997).

[14] The demand function has been specified as $\pi(K) = A\left(1 - \frac{1}{K^\alpha}\right)$ with parameter values $a_L = .5,\ a_H = 10,\ A = 2000,\ \alpha = .3,\ \beta = .4$ and $w = .2$. The scale above 10% has been modified to emphasize the behavior of the economy around the 10% threshold.

generation t, while 1% refers to the singleton coalition, or monopolist coalition. The simulation illustrate the amplification mechanism. Two economies that are closely related, can adopt two different paths of development. For arbitrarily close wealth distributions, one wealth distribution can be in the basin of attraction of, say, $F^0(.)$ while the other economy is in the basin of attraction of $F^1(.)$. This result reaffirms the earlier statement that small initial differences can explain large long-run outcomes. Furthermore it supports the view that, on the one hand, shocks on the wealth distribution can have long-lasting effects if they are large enough to have the economy change basins of attraction, and on the other hand, redistribution can have no long-term benefits if it does not allow the economy to move out of the institutional trap it was initially stuck in.

5 Concluding Remarks

This paper has described and analyzed a model of dynamic institutional choice, in which the distribution of wealth is a key variable. The paper thus provided a rationale for the persistence of wealth inequality and poor institutional performance, which accounts for the wide range of observed institutional choices.

The results rely on the assumption that credit markets are imperfect and that transfers across agents are restricted (assumption A1), creating the scope for a political economy argument. Nevertheless, such an assumption can be significantly weakened and yet the results will still hold. As mentioned earlier, the results of the model rely on the tension between ex-ante wealth constraints and ex-post competition. The results would thus be robust as long as wealth constraints are binding. Some degree of credit rationing is indeed sufficient for the ex-ante-wealth-constraint effect to subsist. Similarly, explicit collusion among agents has been prohibited. Partially removing such an assumption would not harm the results significantly. Some lack of coordination among entrepreneurs is indeed required in order for the ex-post-competition effect to kick in.

Furthermore, throughout the paper, the bureaucrat is assumed to have concern only for bribes. As in many models of regulatory capture, a small departure from a social motive is sufficient to create the scope for rent-seeking activities. The same remark holds in the present case. More importantly, the equilibrium of the static model depends heavily on the timing of the game. Wealth constraints would not bind if bribes could be paid at the end of $T = 2$, once production is realized. Equivalently, this would mean that bribes could be made in project shares rather than cash. Such an arrangement was ruled out as such contracts cannot be verified in court. Admittedly, little has been said on the role of the bureaucrat, especially in the dynamics. First, investigating the issue of bureaucracy design is beyond the scope of this paper and would otherwise deserve much attention.[15] Second, if the bureaucrat is reduced to granting licenses, a simple mapping exercise allows the model to describe situations of political competition, in which the bureaucrat need even not be a physical player. Long-run steady states would then describe democratic and oligarchic political institutions.

While this paper provides a rationale for the persistence of inequality through the poor design of institutions, few empirical studies have been made so far that investigate a causal relationship between the distribution of wealth and the design of institutions.[16] This issue definitely deserves attention in future research. However, as argued in this paper, any undertaking faces the difficulty of identifying how such mechanisms as wealth distribution and institutions are jointly determined and thus serially correlated.

[15] See e.g. Acemoglu and Verdier (2000)

[16] Barnerjee, Mookherjee, Munshi and Ray (2001) is one example. Their identifying assumption relies on the absence of feedback effect from institutional efficiency (extent of diversion in a sugar cooperative) to subsequent wealth inequality.

6 Appendix

Proof of Proposition 6:
The result is standard in the bargaining literature. It is implicitly assumed that there is some cost of delay so that consensus is achieved in the first period. Furthermore, each individual is given at the first round an equal probability to make the first offer at the second round and capture all the rents (as the last round is the zero-contribution schedule). Thus, there exists only one contribution schedule acceptable in the first round, which consists of equal contributions from all members of the same coalition.
Second, the bids are outcomes of a first-price auction with complete information.

Proof of Lemma 8:
The intuition is clear enough so that no formal proof is necessary.

Proof of Proposition 9:
The proof consists of two parts: the first part shows that any coalition structure Φ containing γ_ι^m must be of the form

$$\Phi = \left\{ \gamma_\iota^m, \{i\}_{i \in \bar{\gamma}_\iota^m}, \varnothing \right\},$$

and the second part shows that γ_ι^m forms in any equilibrium.
Part 1: γ_ι^m is characterized by the wealth constraint condition, i.e.

$$\sum_{i \in \gamma_\iota^m} \min \left\{ a_i, \eta^{\gamma_\iota^m} \left[\pi' \left(\eta^{\gamma_\iota^M} \right) - \pi'(1) \right] \right\} > \sum_{i \in \bar{\gamma}_\iota^m} a_i.^{17}$$

Pick any $i \in \bar{\gamma}_\iota^m$,if $\gamma_i \subseteq \bar{\gamma}_\iota^m$ then

$$\begin{aligned} \sum_{j \in \gamma_i} \min \left\{ a_i, \eta^{\gamma_i} \left[\pi' \left(\eta^{\gamma_I} \right) - \pi'(1) \right] \right\} &\leq \sum_{j \in \gamma_i} a_i \\ &\leq \sum_{i \in \bar{\gamma}_\iota^m} a_i \\ &< \sum_{i \in \gamma_\iota^m} a_i \end{aligned}$$

so that γ_i cannot be a winning coalition. Thus it must be the case that

$$\gamma_i \cap \gamma_\iota^m \neq \varnothing,$$

[17] The particular case of strict inequality is ruled out as non-generic.

which implies that any coalition structure must have the singleton $\{i\}$.

Part 2: Sufficient condition: γ_ι^m is the preferred coalition announcement for all members of γ_ι^m. Furthermore, as shown in Part 1, if γ_ι^m forms, then γ_ι^m will be the licensing decision of the bureaucrat. A backward induction argument makes the point: if i is the last member of γ_ι^m to make an offer, then in the subgame where every previous member has announced γ_ι^m, it is a strictly dominating strategy for i to announce γ_ι^m. Consider the subgames where every member after $j \in \gamma_\iota^m$, j being the k^{th} $\left(1 < k \leq \eta^{\gamma_\iota^m} N\right)$ member of γ_ι^m, has announced γ_ι^m. Then it is a strictly dominant strategy for j to announce γ_ι^m. Thus the backward induction argument holds and γ_ι^m forms. The necessary condition is then straightforward: any coalition structure that does not contain γ_ι^m will be subject to deviation from members of γ_ι^m.

Proof of Lemma 10:

The proof is given in the text.

Proof of Lemma 11:

Any steady-state distribution must be supported by a stationary parameter η. Then equations (8) and (9) are the unique stationary wealth levels for insiders and outsiders.

Proof of Proposition 12:

Suppose that $w = 0$. $F^\eta(.)$ is a steady state if and only if the coalition γ of size η, composed of individuals of wealth $a^\infty(\eta)$ is the equilibrium coalition of the static game, i.e.

$$\gamma = \arg \max_{\substack{\gamma' \in P(I) \\ S^\gamma \geq S^{\gamma'}}} \pi'\left(\eta^{\gamma'}\right) - \frac{1}{\eta^{\gamma'}} S^{\bar{\gamma}'}.$$

This is equivalent to have

$$1 = \arg \max_{\lambda \leq 1} \pi'(\lambda\eta) - \frac{1-\lambda}{\lambda} a^\infty(\eta) \tag{14}$$

so that γ "does not break down". $\forall \lambda \leq 1$,

$$\pi'(\eta) \geq \pi'(\lambda\eta) - \frac{1-\lambda}{\lambda}\frac{\beta}{1-\beta}\pi'(\eta)$$

or, $\forall \lambda \leq 1$

$$1 + \frac{\beta(1-\lambda)}{\lambda(1-\beta)} \geq \frac{\pi'(\lambda\eta)}{\pi'(\eta)}. \tag{15}$$

Under assumption A6, the right-hand side of (15) is uniformly decreasing in η. Thus, choosing ε so that for $\eta = 1-\varepsilon$, inequality (15) holds for any $\lambda \leq 1$, but holds with equality for some $\lambda \leq 1$, then the monotonicity property of $\frac{\pi'(\lambda\eta)}{\pi'(\eta)}$ induced by assumption A6 implies that

$$\forall \lambda \leq 1, 1 + \frac{\beta(1-\lambda)}{\lambda(1-\beta)} \geq \frac{\pi'(\lambda\eta)}{\pi'(\eta)}$$

if and only if

$$\eta \geq 1-\varepsilon.$$

$\varepsilon \leq 1$ is obtained for some values of β in an open ball centered around $\frac{1}{2}$. Finally, it is easy to verify that $\{0\}$ is a steady state for low enough values of w.

Consider now η so that $F^{\eta}(.)$ is a steady state. Then a necessary condition is that eviction occurs at each period:

$$(1-\eta)\, a^{\infty} \leq \min\left\{\eta a^{\infty}(\eta)\ ;\ \eta\left[\pi'(\eta) - \pi'(1)\right]\right\}. \tag{16}$$

Moreover (14) is necessary for the robustness of the coalition, i.e. there is no incentive to evict further insiders:

$$1 = \arg\max_{\lambda \leq 1} \pi'(\lambda\eta) - \frac{1-\lambda}{\lambda} a^{\infty}(\eta) \tag{17}$$

For low enough values of w, (16) holds strictly, so that for any small perturbation on the wealth distribution (16) still holds. Moreover, as $1-\varepsilon$ is defined as the minimum value of η so that (17) holds. Thus, for any $\eta > 1-\varepsilon$, (17) holds strictly. Similarly, small perturbations on the wealth distribution do not change the outcome of (17). Then, for $\eta > 1-\varepsilon$, $F^{\eta}(.)$ is asymptotically stable.

Proof of Proposition 13

Suppose that for some $t \geq 1$, I is the equilibrium coalition so that

$$I = \arg \max_{\substack{\gamma \in P(I) \\ S_t^{\gamma} - S_t^{\bar{\gamma}} \geq 0}} \pi'(\eta^{\gamma}) - \frac{1}{\eta^{\gamma}} S_t^{\bar{\gamma}}$$

Then for any $\gamma \in P(I)$, the wealth transition implies that

$$S_{t+1}^{\gamma} - S_{t+1}^{\bar{\gamma}} \leq S_t^{\gamma} - S_t^{\bar{\gamma}}$$

so that

$$\left\{\gamma \in P(I), S_{t+1}^{\gamma} - S_{t+1}^{\bar{\gamma}}\right\} \subseteq \left\{\gamma \in P(I), S_t^{\gamma} - S_t^{\bar{\gamma}}\right\}$$

and consequently,

$$I = \arg \max_{\substack{\gamma \in P(I) \\ S_{t+1}^{\gamma} - S_{t+1}^{\bar{\gamma}} \geq 0}} \pi'(\eta^{\gamma}) - \frac{1}{\eta^{\gamma}} S_{t+1}^{\bar{\gamma}}$$

Proof of Proposition 14:
Suppose that for some $t \geq 1$, Γ_t is the equilibrium coalition so that

$$\Gamma_t = \arg \max_{\substack{\gamma \in P(I) \\ S_t^{\gamma} - S_t^{\bar{\gamma}} \geq 0}} \pi'(\eta^{\gamma}) - \frac{1}{\eta^{\gamma}} S_t^{\bar{\gamma}}$$

and

$$\eta^{\Gamma_t} \leq \eta^*,$$

where

$$\eta^* \pi'(\eta^*) - (1 - \eta^*) w \equiv \frac{1-\beta}{\beta} \left[\pi'(1) - w\right].$$

Condition (11) guarantees existence of such η^*. Under condition (10),

$$S_{t+1}^{\bar{\Gamma}} \leq S_t^{\bar{\Gamma}}$$

and furthermore, for any $\gamma \in P(I)$, if

$$\eta^{\gamma} \leq \bar{\eta},$$

then

$$\eta^{\gamma} \pi'(\eta^{\gamma}) - (1 - \eta^{\gamma}) w \leq \frac{1-\beta}{\beta} \left[\pi'(1) - w\right]$$

so that

$$S_{t+1}^{\gamma} - S_{t+1}^{\bar{\gamma}} \geq S_t^{\gamma} - S_t^{\bar{\gamma}}.$$

This implies that if $\Gamma_{t+1} \in P(I)$ is time $t+1$ equilibrium coalition, then, by definition,

$$\eta^{\Gamma_{t+1}} \leq \eta^{\Gamma_t}$$

and under condition (12)

$$\eta^{\Gamma_{t+1}} \leq \eta^*.$$

This completes the induction argument. Thus, for any sequence of equilibrium coalition sizes $\left(\eta^{\Gamma_t}\right)_{t \geq 1}$ such that there exists $t \geq 1$, such that $\eta^{\Gamma_t} \leq \bar{\eta}$, is non increasing after t. Denoting by

$$\eta^{**} = \inf \left\{ \eta \in [0,1], \exists \lambda \in [0,1], 1 + \frac{\beta}{1-\beta} \frac{1-\lambda}{\lambda} < \frac{\pi'(\lambda\eta)}{\pi'(\eta)} \right\},$$

condition (13) guarantees existence of such η^{**} and the stability property derived previously implies that $\eta^{**} > 0$. Thus, defining

$$\bar{\eta} = \min \{\eta^{*}, \eta^{**}\},$$

any coalition size flow such that there exists $t \geq 1$ where $\eta^{\Gamma_t} \leq \bar{\eta}$, then necessarily converges to 0, so that the corresponding flow $(F_t)_{t\geq 1}$, converges to $F^0(.)$.

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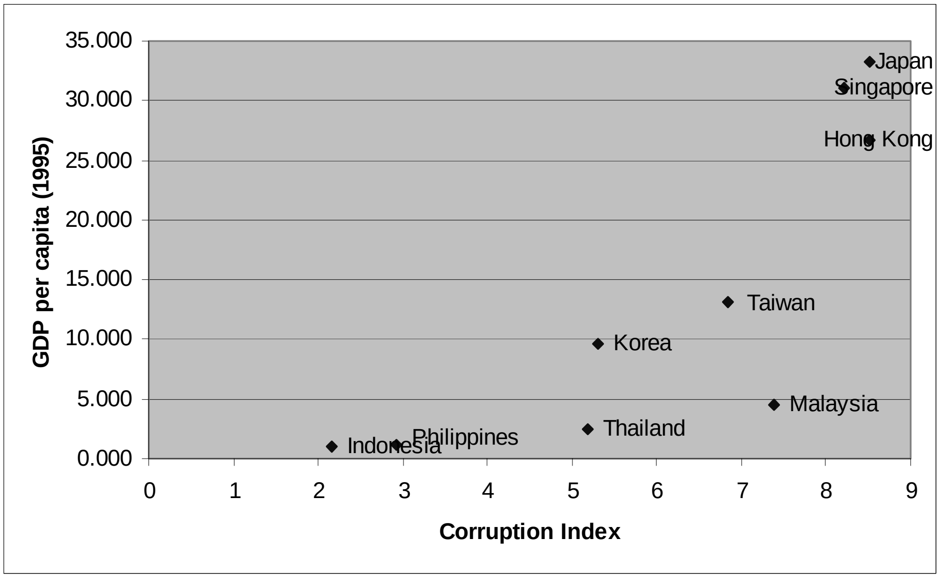

Figure 1: Corruption Index and GDP - Source: La Porta et al (1998)

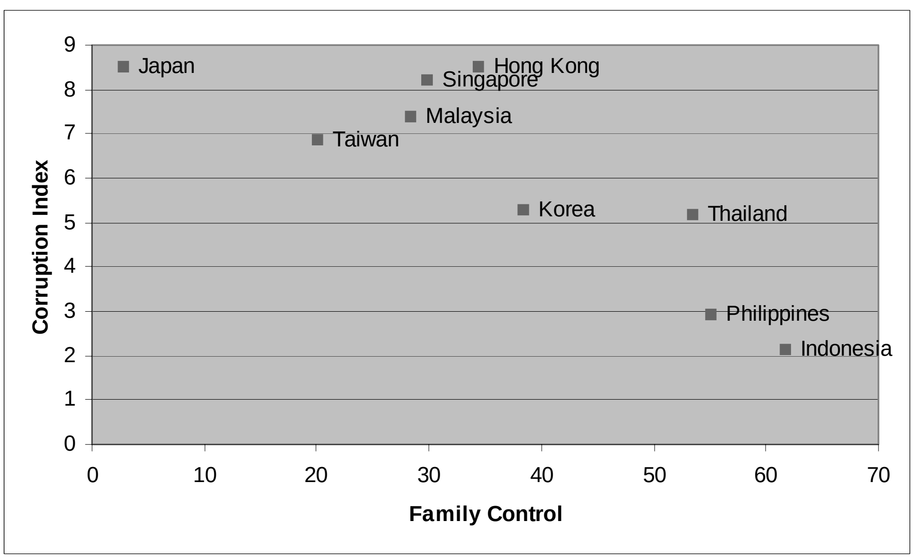

Figure 2: Corruption and Wealth Concentration - Source: Claessens et al (1998)

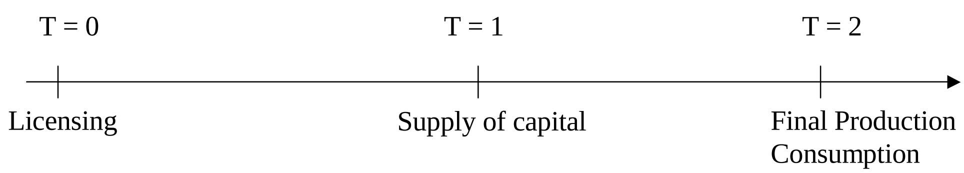

Figure 3: Time line

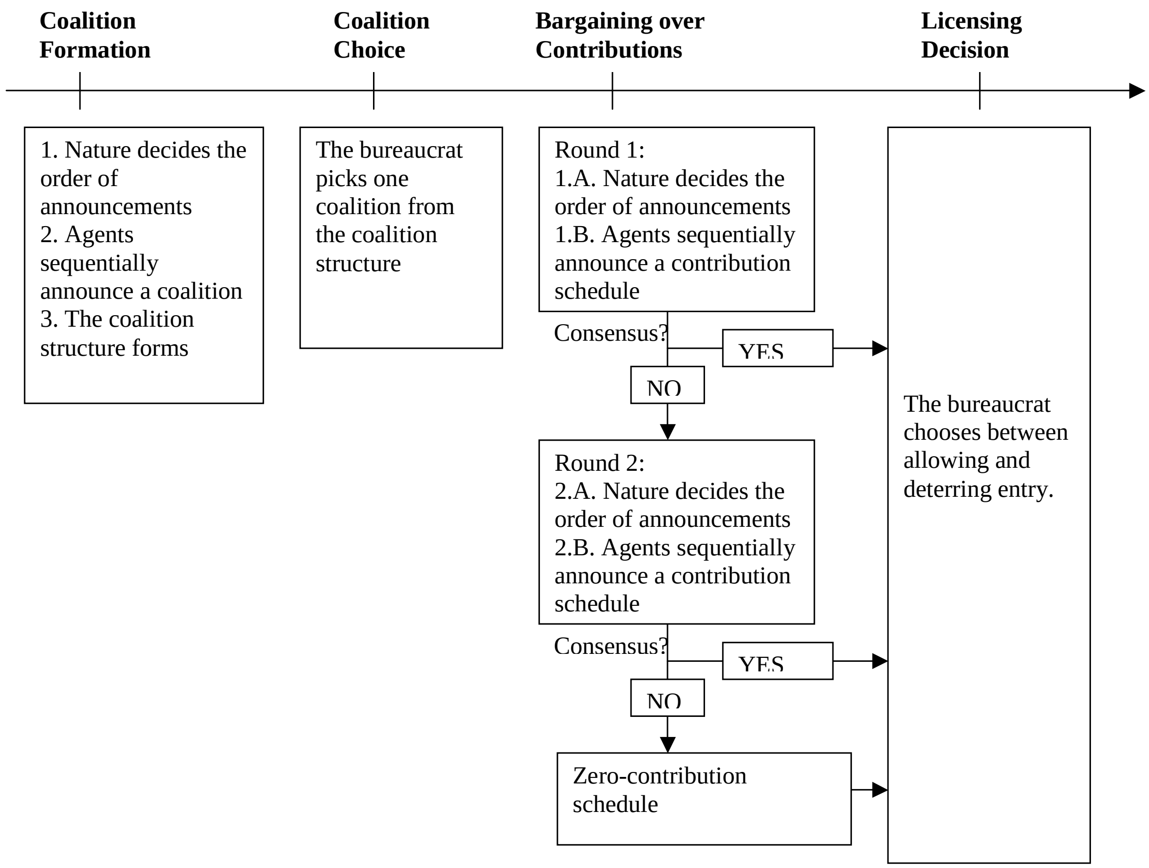

Figure 4: From Coalition Formation to Licensing Decision

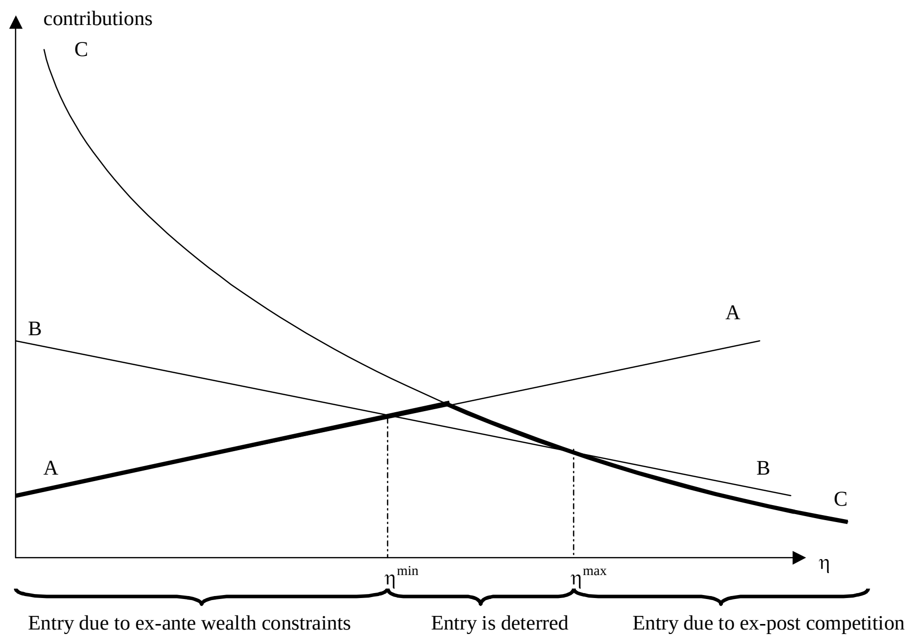

Figure 5: The Group Size Paradox

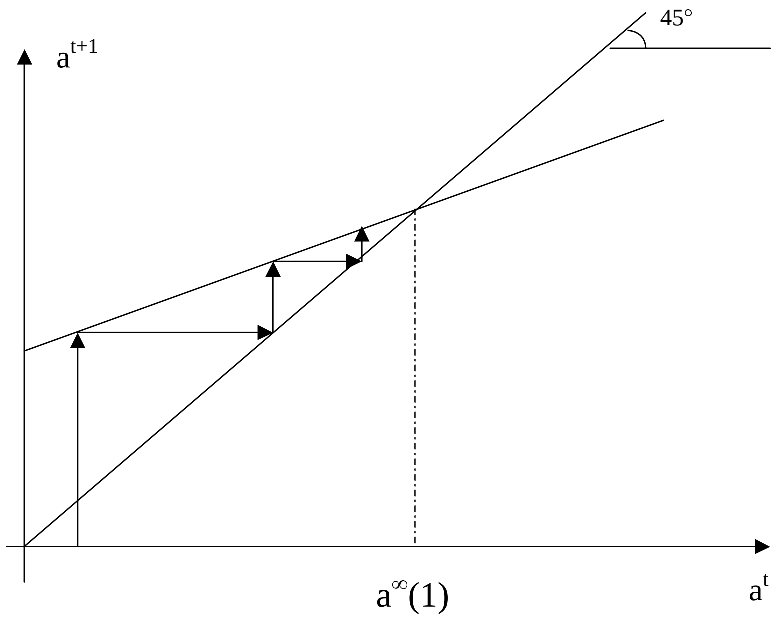

Figure 6: Wealth dynamics - no-corruption case

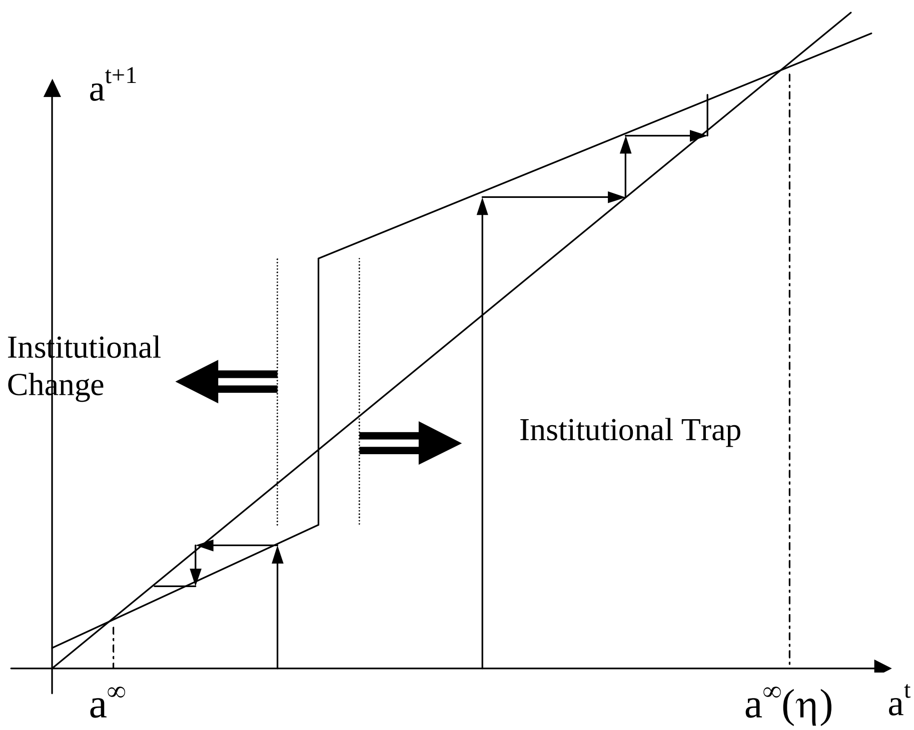

Figure 7: Wealth dynamics - general case

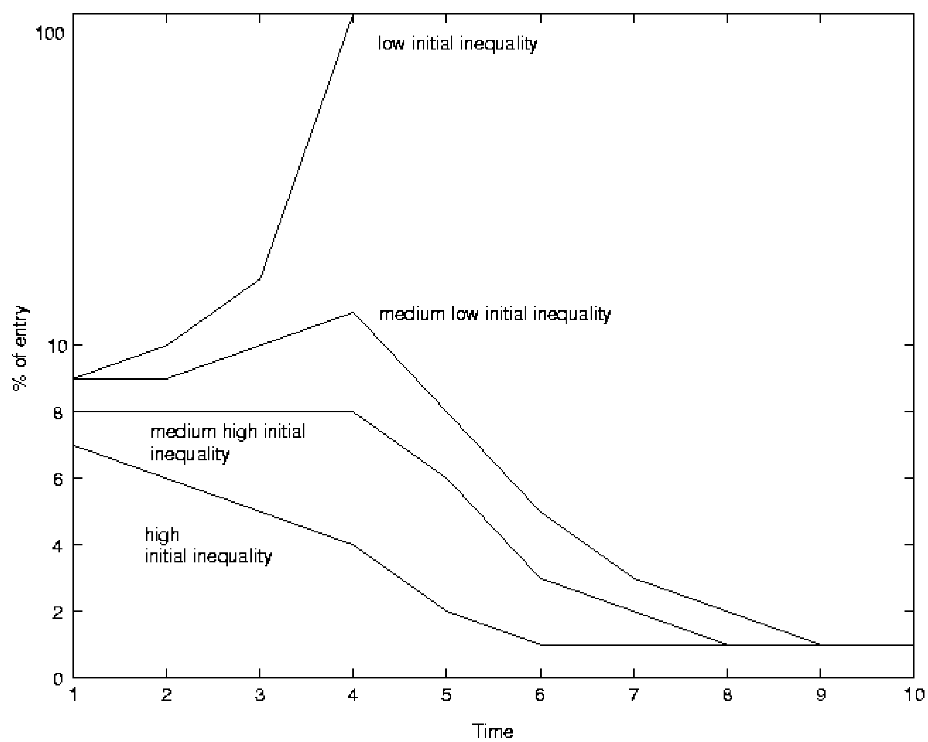

Figure 8: Wealth dynamics - simulation